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Dr. Lee, President, in the Chair.

Rev. J. Morton, Clifton;
J. F. Beckett, Esq., R.N.;
Rev. E. K. Elliott, Broadwater; and
N. Martindale, Esq., Holmfield, near Liverpool,

were balloted for and duly elected Fellows of the Society.

On a Re-discovery of the missing Lunar Crater, Alhazen, situated on the western border of the Mare Crisium. By W. R. Birt, Esq.

The Rev. T. W. Webb, in his interesting catalogue of lunar objects, speaks thus of this crater:—

"On the western edge of the *Mare Crisium*, Schröter delineated a crater, called by him *Alhazen*, which he employed to measure the existing libration: he saw in it, after a time, unaccountable changes; and now it is said it cannot be found. Beer and Mädler think he confounded it with a crater lying further south; the question, however, which in the interim was debated between Kunowsky and Köhler, is not quite cleared up."

Having obtained a view, in January last, of *two* objects which appeared to me to have given rise to Schröter's remarks, I communicated my observations to Mr. Webb, and have lately received from that gentleman the following historical notices

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of *Alhazen*, bearing especially on the variability of its aspect:—

"Schröter had watched and measured from it for years, and found it too varying in aspect to be accounted for by the varying angle of illumination. At first it was a depressed surface, surrounded by a ring, and distinguished from the neighbouring objects under all angles by its dark grey tint. Subsequently it often appeared, even in a 27-foot reflector (mirror about 20 inches), under favourable circumstances, as a bright longish flat mountain, though *more* frequently in its original grey aspect; occasionally it would be so indistinct, other objects being well defined, that he could not tell what to make of it. 1797, March 1, *Alhazen* being very near the limb (only $27''\cdot27$ from it), and therefore in a position to be very indistinct, especially as the terminator had advanced to the other side of the *Mare*, he saw it with a 13-foot reflector (mirror about 9 inches and power 180) more distinctly than ever, and in quite a new form, as a real, very deep, and bright crater, with an irregular ring scarcely united to the south, and open to the north, with a projection on the east side. Also there was a small shadow, as of a crater never seen before during the innumerable observations of ten years. Schröter thought *Alhazen*, under this aspect, appeared as deep as *Proclus*."

Mr. Webb enclosed a tracing, with this remark:—"I think you will consider it as affording an interesting comparison with your own observations. He has figured, you will see (as well as described), a little crater where you describe 'two (?).' The circumstance of his ranges uniting so closely to the south may be due to a different libration."

Kunowsky, in the *Astronomische Jahrbuch* for 1825, speaks of *Alhazen* as lost. In the *Jahrbuch* for 1826, Pastorff, writing January 20, 1823, says his son repeatedly found *Alhazen*. Pastorff also saw it (see p. 250 of the same *Jahrbuch*).

In the *Jahrbuch* for 1827 (p. 135), Harding is recorded as having seen *Alhazen* as Schröter had drawn it. Pastorff saw it in the same year, and in 1829.

The difference of aspect, as well as the occasional difficulty of finding this interesting spot, is highly curious. Schröter's earliest delineation gives it, as described, a shallow depression, *entirely* surrounded by a ring. My own observations, which now follow, may perhaps throw some light on these differences and difficulties. Two ranges of mountains, *one behind the other*, may easily be taken for a crater, and at a certain angle of illumination it may be exceedingly difficult to distinguish the difference. After a while the supposed crater entirely vanishes; libration alters the visual angle, and rotation the illuminating one, the observer being greatly puzzled as to what has become of his well-recognised crater.

1862, Jan. $3^{d}\ 4^{h}\ 45^{m}$ to $6^{h}\ 0^{m}$, Moon's age $3^{d}\cdot1$, the termina-

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tor passing through the *Mare Crisium* a little west of *Picard*, the floors of *Cleomedes*, *Burckhardt*, *Geminus*, and *Bernouilli* being in deep shadow, the *Promontorium Agarum* was very distinct, and in fine relief, and the craters *Condorcet*, *Hansen*, and *Alhazen* of Beer and Mädler exceedingly well marked; the *Alhazen* of Schröter also very distinct, and *Eimmart* between it and *Cleomedes* well seen.

Schröter's *Alhazen*, at first sight, appears to have somewhat the appearance of a crater, the west edge being high, but the east much lower. Upon attentively considering it, I have some reason to think that it consists of *two* nearly parallel ranges of mountains just on the borders of the *Mare*, the eastern range forming a part of the actual border. The shadow of the western range is (under this illumination) terminated at a line west of the eastern range, the western slope of which is glowing in bright sunshine. The mountain south of *Alhazen*, also figured by Schröter, is exceedingly distinct, and stands on the border of the *Mare*.

From the circumstance of not finding a distinct crater in this part of the border of the *Mare Crisium* when the evening shadows set in and the terminator sweeps over the western border of the *Mare*, combined with the surface of the *Mare* running in amongst the mountains on the west of the *Mare*, I am the more inclined to consider the appearance of a crater to be produced when the shadow of the western range falls short of the eastern.

1862, Jan. 4^{d} 5^{h} 30^{m} to 7^{h} 16^{m}, Moon's age $4^{d}\cdot 1$, terminator obliquely through *Atlas*. *Oersted*, *Cepheus*, *Franklin*, and *Berzelius*, with *Promontorium Archideum*, form a fine chain between *Atlas* and *Geminus*.

At times the definition has been very fine, and the real character of Schröter's *Alhazen* well seen; the southern termination of the two mountain-ranges was seen to be quite separate the one from the other, and the level surface passing between them. It is not surprising that the two combined should have been regarded as a crater, especially if viewed by a low power; for now, haze coming on, it is impossible to distinguish the two from a crater. In the earlier part of the evening the independence of the two ranges, especially on the south, was very apparent: the *shorter* shadow brought out very distinctly the *mountain* character, and the recess of the shadow of the eastern range revealed the existence of two (?) small craters lying at the foot of the eastern slope, upon the very border of the *Mare Crisium*. Beer and Mädler figure two mountain-ranges in the locality, but very unlike the mountain-ranges described above.